

**Absolute Position Encoder Requiring Less than One Encoding Track per Bit**

**ABSTRACT**

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An absolute encoder for measuring the position of a surface is disclosed. The encoder includes first and second encoding tracks. Each encoding track includes a code strip imaging system and an array of  $n$  photodetectors, where  $n > 1$ . Each code strip imaging system generates an image from a code strip that is focused on the corresponding array of  
10 photodetectors. Each image includes alternating dark and light stripes. The width of the first code strip is chosen such that  $nd_i = D_i$ , where  $d_i$  is the width of the photodetectors in the array in the  $i^{\text{th}}$  encoding track and  $D_i$  is the width of the stripes in the code strip image in that track. The widths of the stripes and photodetectors are chosen such that  $d_1 = nd_2$ .